# DISAPPEARING SATURN RING SPOKES MIGHT RETURN, SCIENTISTS SAY

**WASHINGTON, MARCH 21** -- The unusual spokes that appear briefly on the rings of Saturn and then disappear for years at a time might become visible again by July, according to a study led by the University of Colorado in Boulder (CU-Boulder).

NASA's Voyager spacecraft first spotted the spokes -- up to 9,656 kilometers long and 2,414 kilometers wide -- 26 years ago, said Mihaly Horanyi of the CU-Boulder Laboratory for Atmospheric and Space Physics.

But when the Cassini spacecraft arrived at Saturn in July 2004, the radial features that cut across Saturn's ring plane were gone, a development that disappointed and puzzled many scientists, said a March 16 CU-Boulder press release.

The Hubble Space Telescope occasionally saw the ring spokes in the late 1990s, Horanyi said, but the spokes gradually faded -- a result of Saturn's seasonal, orbital motion and its tilted axis of rotation that altered the light-scattering geometry.

"The spokes were switched off by the time Cassini arrived," Horanyi added.

"We think it is a seasonal phenomena related to the sun rising and setting over the ring plane that changes the physical environment there," he said, "making it either friendly or hostile to their formation."

The spokes are made of tiny dust particles less than a micron wide -- about 1/50th the width of a human hair -- that collect electrostatic charges in the environment of the rings and become subject to electrical and magnetic forces, Horanyi said.

The right conditions cause the particles to gain an extra electron, allowing them to leap from the surface of ring debris for brief periods, forming the giant spokes that appear dark against the lit side of the rings and bright against the unlit side of the rings.

A paper on the subject, authored by Colin Mitchell and Horanyi of CU-Boulder, Ove Havnes of the University of Trosmo in Norway and Carolyn Porco of the Space Science Institute in Colorado, appears the March 17 issue of Science magazine.

## ANGLE OF RING PLANE TO SUN MIGHT AFFECT FORMATION

The researchers hypothesize that conditions for the spokes to form depend on a decrease in the angle of the ring plane to the sun.

"Because the rings are more open to the sun now than when Voyager flew by," the researchers wrote in Science, "the charging environment above the rings has prevented the formation of the spokes until very recently."

Cassini first photographed a small version of Saturn's spoke rings from a distance of 157,716 kilometers in September 2005 that were 3,541 kilometers long and 97 kilometers wide, Horanyi said.

As the ring plane angle decreases, conditions seem to become more suitable for spoke formation.

Cassini now is orbiting too close to the ring plane to make observations, but the researchers expect the spoke activity to return by the time the spacecraft changes position in July.

When the spokes are visible again, the research team believes spoke activity will continue for about eight years, Horanyi said, followed by six years to seven years without spokes.

But that is just a theory. "This is a weird phenomena we don't have the full story on yet," Horanyi said.

The full text (http://www.colorado.edu/news/releases/2006/102.html) of the press release is available on the University of Colorado Website.

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